

# END GRIDLOCK NOW

## PROJECT PRIORITIES for the Regional Transportation Investment District *A Recommended Approach*

Oct. 17, 2002

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Under E2SSB 6140, Snohomish, Pierce and King Counties are to establish a list of projects to relieve traffic congestion. This presentation describes an approach to setting priorities for multiple roadway improvement projects. ***Our recommended approach focuses on a project's contribution to congestion or delay reduction, as required by E2SSB 6140.***

# OBJECTIVE

- Provide a system for Project Priorities...
- ...using an example that would make travel conditions better than today, by
  - Adding roadway capacity
  - Reducing delay per person or per trip

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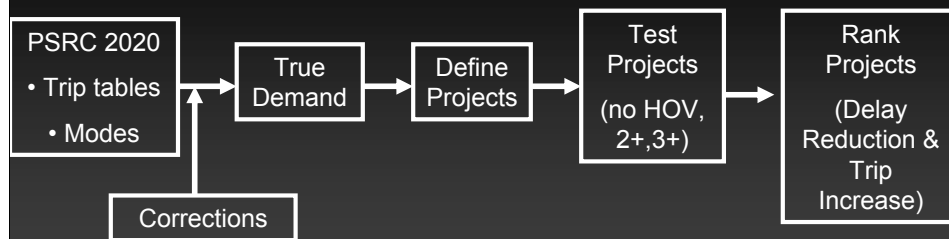
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To illustrate the system for setting project priorities, this presentation uses an example set of projects. These projects were selected with the objective of making 2020 travel conditions better than today by:

- Adding roadway capacity to serve both existing deficiencies and future growth in demand, and
- Reducing total regional delay and delay per trip

# EVALUATION METHODOLOGY



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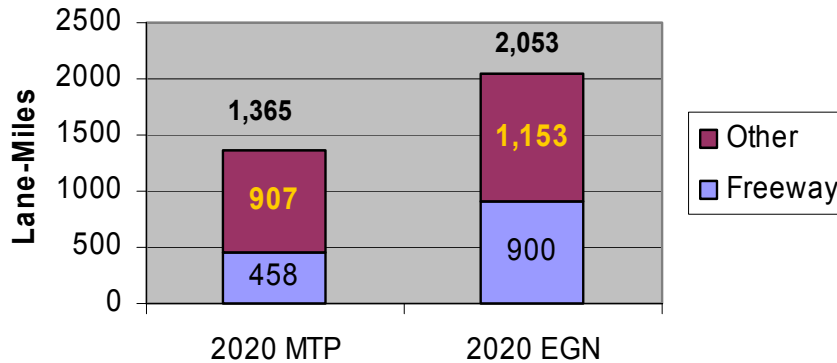
The process started with the PSRC travel model, using its 2020 trip tables. These trip tables show the number of trips between all origin/destination pairs, by mode of travel. Modes of travel (auto, transit, for example) were not changed. To maintain comparability among alternative projects, these trip tables were not allowed to change. Corrections were made to the model to use more realistic free-flow speeds, to correct errors in a few roadway links (lengths and speeds, for example), and to improve the relationship between traffic volumes and the resulting speed of traffic flow.

The first model run removed capacity constraints on the roadway network. This provided an estimate of **“true demand” showing where people wanted to be**, not the routes forced by limitations of capacity on key links of the network. This showed, for example, that if trips could follow their desired route, I-5 through central Seattle would need 2 to 3 lanes of additional capacity in each direction. It also showed that **few trips wanted to be on the Alaskan Way Viaduct; trips on the Viaduct are there because of capacity limitations on I-5**. This “true demand” run was the basis for identifying a total of 26 roadway improvement projects. These will be identified on later slides.

These 26 projects were added to the model’s roadway network (which already included PSRC’s 2020 MTP improvements). They were then tested under three different high occupancy vehicle (HOV) assumptions: allowing all traffic to use the HOV lanes, defining HOV as 2+ persons per vehicle, and defining HOV as 3+ persons. Because of PSRC’s high projections of HOV volumes in 2020, the case allowing all traffic to use the lanes did not work well. After correcting for some traffic lost in the occupancy conversion process, the differences between 2+ and 3+ were small.

Finally, projects were ranked by the extent each reduced regional delay. This was done by comparing the vehicle hours of travel for all trips using any portion of each project with the vehicle hours that would have been incurred if these same trips traveled under conditions of the 1998 network.

# 2020 LANE-MILE ADDITIONS



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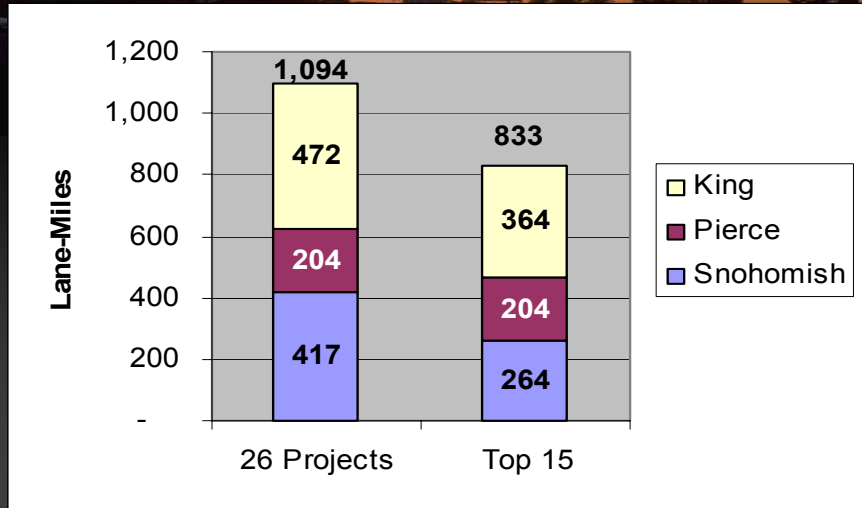
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The 26 projects would add about 2,000 lane-miles to the 2002 regional network. This is about a 6% increase to the current total of about 32,000 lane miles in the 3 county region (roadways of all classifications). The total added is about 50% more than were included in PSRC's Metropolitan Transportation Plan (MTP) for 2020. More important is a doubling of freeway lane-miles compared to the MTP, because of the high productivity of freeway lanes. The EGN increase in lane-miles adds only about 2% more to the total regional system than already included in the adopted Metropolitan Transportation Plan.

The 26 listed projects were selected based solely on the 2020 capacity deficiencies, as indicated by the "true demand" run of the PSRC model. This was done without political considerations, with one exception. The exception is caused by the City of Seattle's policy to discourage any general purpose (GP) capacity enhancement of its primary freeway and arterial system, other than improvements that support transit and HOV modes. I-5 through Seattle was found to be extremely capacity-deficient by 2020 despite the transit plans that are currently being pursued. However, considering Seattle policy, the project list contains only two critical capacity improvements within Seattle. The first would add one GP lane in each direction to I-5 from Northgate to the north City limit. The second would rebuild the aging Spokane Viaduct between Alaskan Way and I-5, adding one GP lane in each direction.

## APPROXIMATE DISTRIBUTION OF EGN LANE-MILES BY COUNTY



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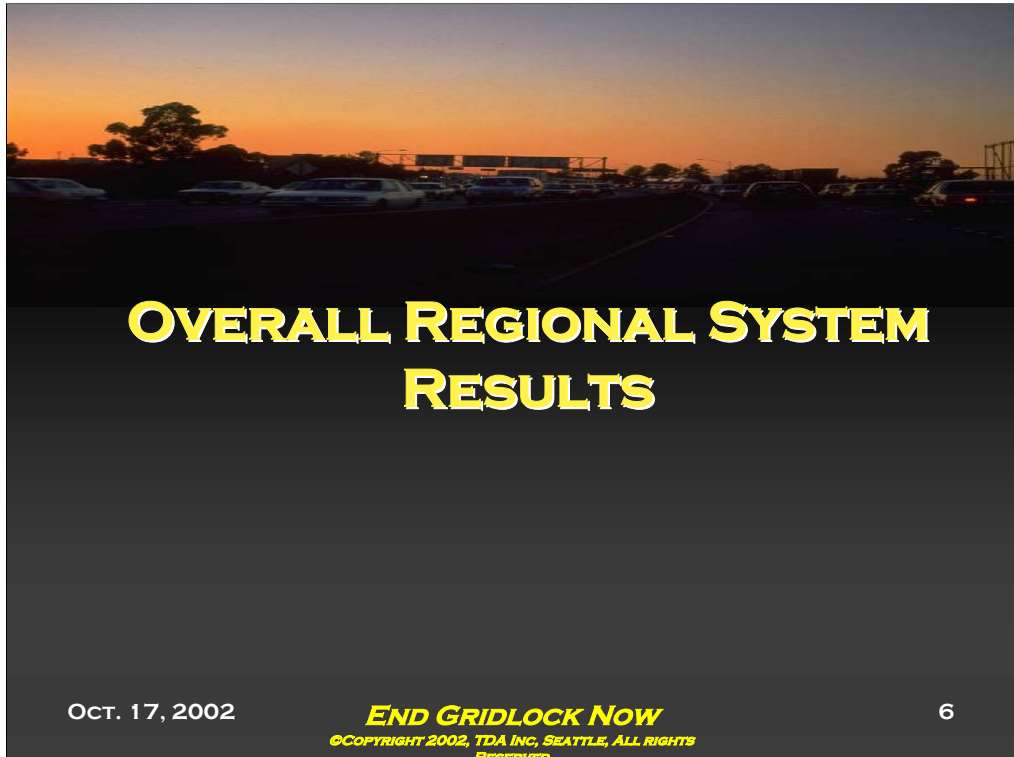
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This shows the approximate distribution of lane-miles by county. For the 26 projects it shows:

- Snohomish County: 38%
- Pierce County: 19%
- King County: 43%

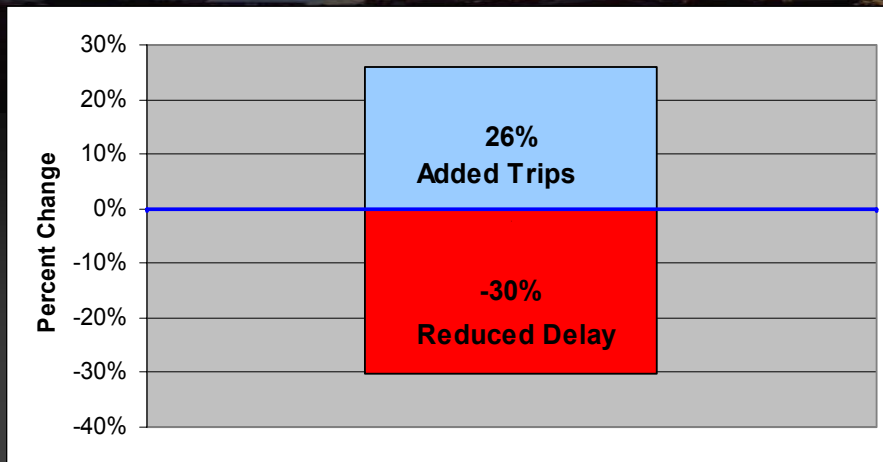
For only the top 15 projects in regional delay reduction, the distribution is similar, with a slight shift to Pierce County:

- Snohomish County: 32%
- Pierce County: 24%
- King County: 44%



The following slides summarize results at the regional system level, illustrating overall improvement in travel conditions with the End Congestion Now (EGN) program. A later section will look at ranking of the individual projects in the EGN program.

# 2002 -2020 INCREASE IN TRIPS COMPARED TO DELAY PER TRIP



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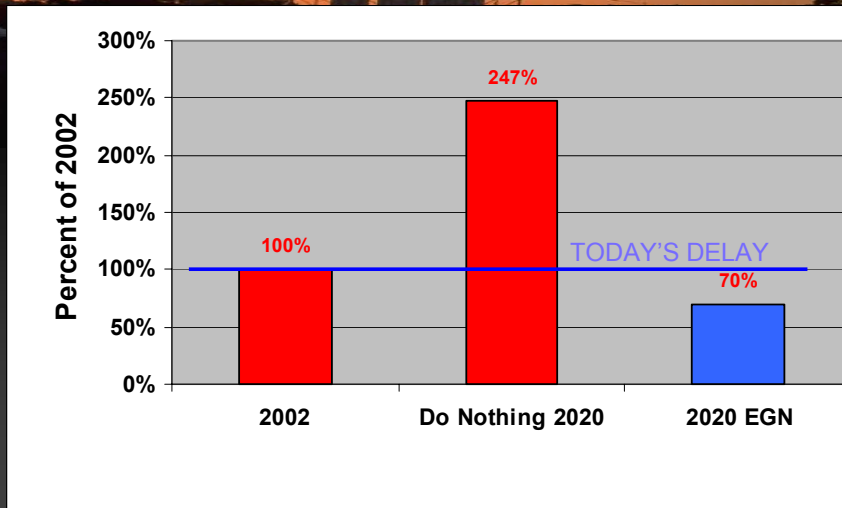
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Based on the PSRC projections, the roadway network will have to carry 26% more trips in 2020 (13.7 million daily person-trips) than in 2002 (10.8 million daily person-trips). Even with this growth in demand the EGN network reduces delay per trip by 30%. The EGN 6% addition to our regional roadway network is a modest increase to compensate for 3 previous decades of neglect of our highway system and to provide for another two decades of growth. The projects do this while **reducing delay per trip by 30% for both existing travel and the 26% growth expected by 2020.**

To add perspective to the 6% increase in the region's lane-mile total over a five decade period (the 3 decades of highway neglect plus the next 2 decades), this increase translates to adding about 1.2% to our lane miles per decade. Over a comparable period, regional travel, measured in vehicle-miles-traveled (VMT), will have increased more than 25% per decade. In other words, vehicle travel will have been growing at a rate more than 20 times that of the increase in lane-miles to serve that demand. Even with that disparity, travel conditions in 2020 with EGN will be better than today.

# REGIONAL DELAY PER TRIP



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If projected 2020 traffic used the road network that exists today, delay per trip would be about 2.5 times today's level (and today's is bad enough). The 26 End Gridlock Now projects would reduce the delay per trip by about 30% from today's levels. Recall that this is done while serving 26% more trips by 2020.

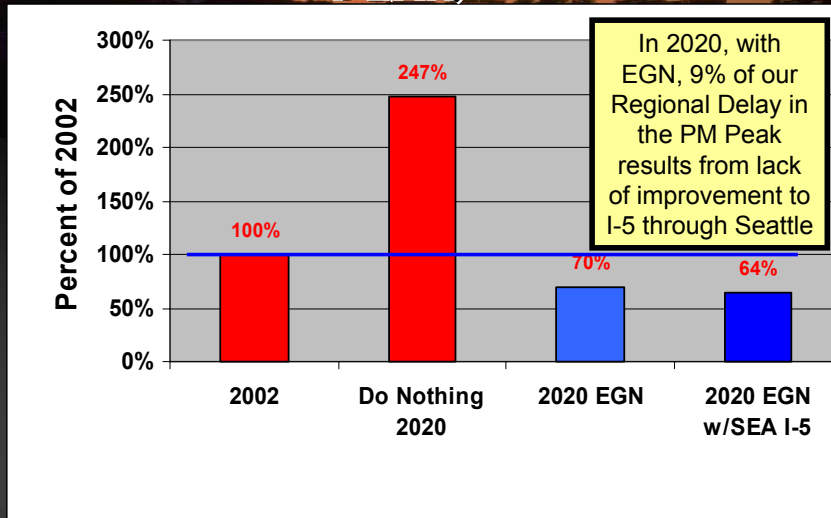
Critics of highway improvement programs depend on the often-repeated myth that "...you can't build new roads because they will just fill up with traffic". Even if it were true (and it isn't), what's wrong with that? Drivers and passengers are not mindless idiots traveling for the sole purpose of consuming capacity. Those trips are satisfying some social or economic goal. Other critics (including some governmental agencies) argue that increased travel is bad and that we should not improve our roadway system to allow increased travel. Why do we single out mobility for this treatment? We build new schools, new libraries, and add capacity to our water/sewer/natural gas/electric systems to meet demand. While conservation is good, it almost never is the sole solution. One of man's goals throughout history has been to increase mobility. Why now do some critics (and government agencies) argue that increased mobility is evil?

Now for the myth part:

- The major portion of our freeway system was completed in about 1970. If it were true that highways "just fill up with traffic", why did about 20 years pass before we began to see serious congestion. Twenty years is a reasonable planning horizon for a transportation program. Now we've let another decade pass without taking action and suffer even more serious congestion.
- We largely ignored our highway system for the last 3 decades. During this same period our motor vehicle travel has more than doubled. Why should we be surprised if there is a pent-up demand from this long neglect of our highways?



## REGIONAL DELAY PER TRIP WITH I-5 EXPANDED THROUGH SEATTLE (PM PEAK)



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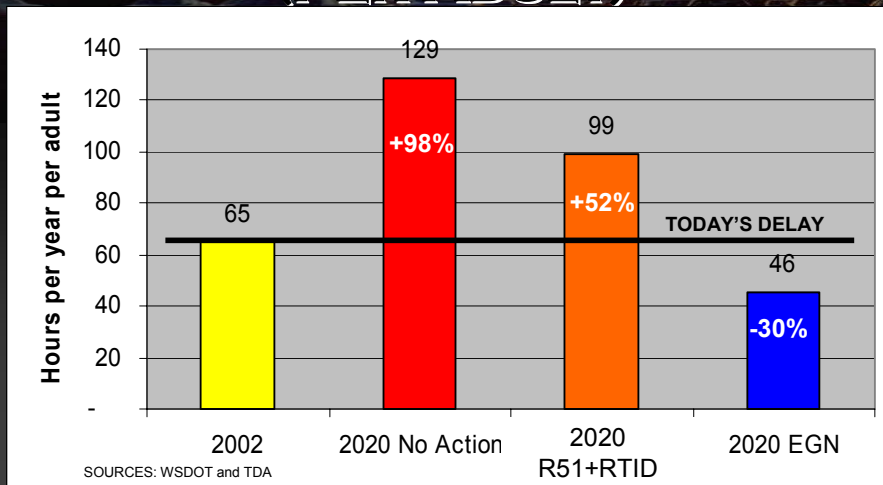
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This adds to the previous chart by showing the regional effect of expanding I-5 through the City of Seattle (adding the capacity of two lanes in each direction from Tukwila to Northgate). Delay per trip is now reduced to 64% of today's level, even with the 26% growth in demand. This means that, in 2020 even with the 26-project EGN program, almost 10% of our remaining Regional delay is caused by not improving I-5 through Seattle.

# ANNUAL HOURS OF TRAFFIC DELAY (PER ADULT)



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This summarizes annual traffic delay per adult for 4 conditions in the 3-county region:

- In yellow (bar #1 on the left), today's estimated 65 hours per year per adult – equal to 8 working days (Source: WSDOT).
- In red (bar #2), 2020 No Action delay of 129 hours per year per adult – equal to more than three 40-hour work weeks (source: WSDOT). “No Action” means no road improvement projects beyond those currently underway or programmed.
- In gold (bar #3), 2020 with the projects proposed for R51 and the October 10<sup>th</sup> estimate for projects under the Regional Transportation Investment District (RTID) program, showing just under 100 hours of delay (source: WSDOT). The RTID program is in its formative stages and may change over the next couple of months.
- In blue (bar #4), year 2020 with the EGN projects, showing a reduction in delay from today's condition (source: EGN). **Note that this is the only 2020 scenario that improves travel conditions over today's delay.**

# THE 26 PROJECTS

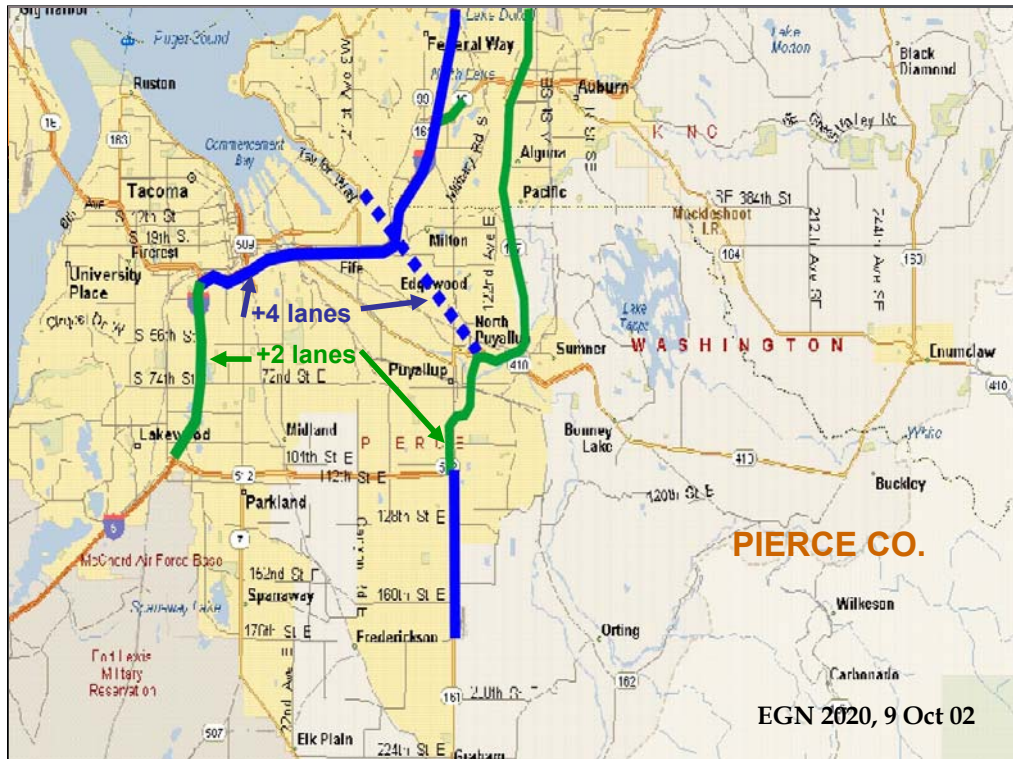
- Pierce County
- King County
- Snohomish County

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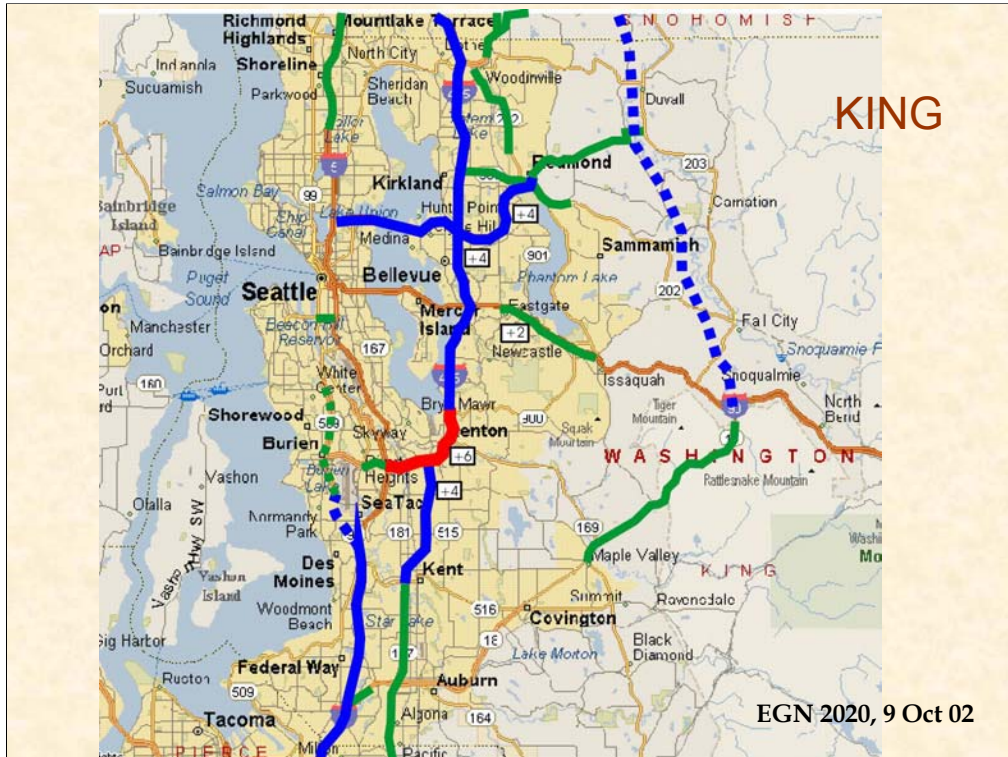
Maps on the following three pages show the 26 projects. Because some projects cross county lines, they may be shown more than once. The last four pages of this document provide more detailed descriptions of the projects.



Of the 26 projects, this slide shows those entirely or partly in Pierce County. These include:

- SR 167 (SR 509 to SR 512 in Puyallup, shown as a dashed, blue line)
- SR 167 (SR 512 to King Co. line)
- I-5 (SR 16 to King Co. line)
- SR 512 (SR 167 to Meridian in Puyallup plus 2 added lanes each direction in Meridian Corridor south)

The colors indicate the number of lanes added: blue is 4 lanes (2 in each direction), green is 2 lanes (1 in each direction). The last 4 pages of this package describe the projects in more detail.



Of the 26 projects, this slide shows those entirely or partly in King County. These include:

- SR 509 Extension from its terminus west of the Airport to a connection with I-5
- I 405 (the preferred project but with one more added lane in each direction between Southcenter and Kenndale)
- SR 509 HOV
- I-5 (Pierce Co. line to SR 509, Northgate to Snohomish Co. line)
- I-605 Junior (I-90 at SR-18 to Snohomish Co. line, shown as a dashed blue line)
- SR 518 (I-5 to SeaTac exit)
- SR 18 (SR 169 to I-90)
- SR 520 (I-5 to SR 202 in Redmond)
- SR 202 (Woodinville to Sahalee)
- SR 908 (Redmond to I-405)
- Novelty Hill Rd (Avondale to SR 203)
- Spokane St. Viaduct (I-5 to SR 99)
- I-90 (Eastgate to Sunset IC)

The colors indicate the number of lanes added: red is 6 lanes (3 more in each direction), blue is 4 lanes (2 in each direction), green is 2 lanes (1 in each direction). The last 4 pages of this package describe the projects in more detail.



Of the 26 projects, this slide shows those entirely or partly in Snohomish County. These include:

- I-5 (King Co. line to the Skagit County line)
- I-605 (King Co. line to SR 9 and SR 96, shown as a dashed line)
- SR 522 (Woodinville to Monroe)
- SR 525 (I-405 to SR 526)
- SR 9 (SR 522 to Skagit Co. line) widened to freeway standards
- SR 92 (SR 9 to Granite Falls)
- SR 2 (SR 9 to Sultan, including the Monroe bypass, shown as a dashed line)

The colors indicate the number of lanes added: blue is 4 lanes (2 in each direction), green is 2 lanes (1 in each direction). The last 4 pages of this package describe the projects in more detail.



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## RANKING of INDIVIDUAL PROJECTS

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The following slides move from the overall regional system effects to the ranking of individual projects. Primarily, this ranking is based on each project's total contribution to the reduction of regional delay. However, a supplemental ranking will be shown for added trips served.

# RANKING PROJECTS BY DELAY REDUCTION

- **Compared:**
  - Vehicle-hours of travel for 2020 EGN trips using any portion of a project with...
  - Vehicle-hours for the same trips under the conditions of the 1998 network

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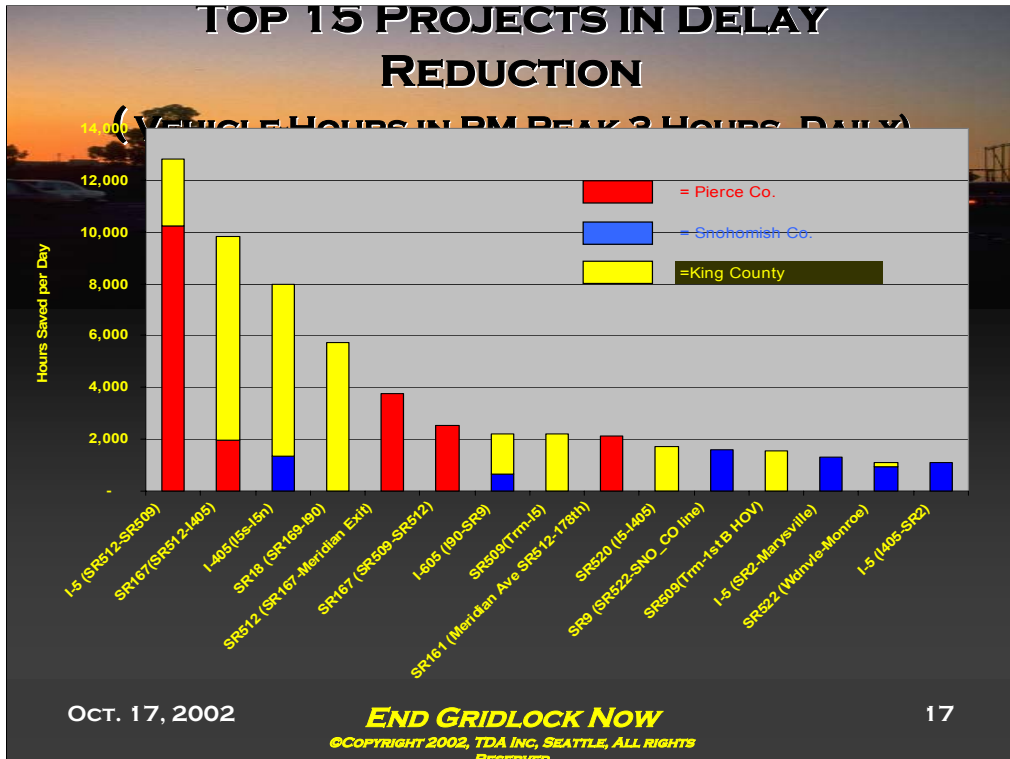
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The purpose here is to prioritize the projects with the largest amount of delay reduction. The results are not necessarily the time reductions that would be used in a benefit/cost analysis.

Here's a summary of the approach for estimating delay reduction from the EGN projects (for the PM Peak Period of 3 hours):

1. For each of the 26 projects, all of the 2020 trips that used part or all of the project were identified.
2. For these trips, total vehicle-hours required were calculated.
3. Then, vehicle-hours were calculated for these same trips, but under the conditions of the 1998 network including 1998 speeds.
4. The difference was the estimate of delay reduction due to the project.

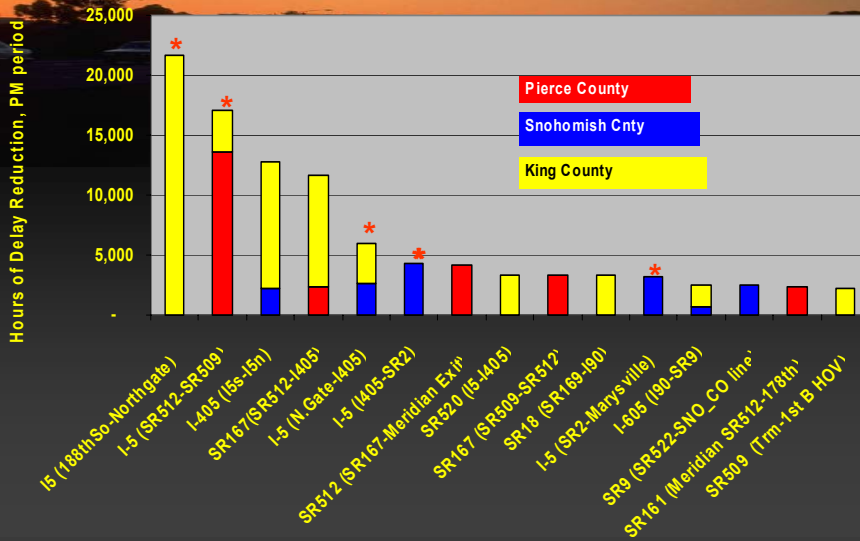




This shows the top 15 performers in reducing regional delay and indicates the approximate contribution by County. (A later slide will show all 26 projects)

# TOP 15 PROJECTS IN DELAY REDUCTION WITH SEATTLE I-5 CAPACITY INCREASED

(VEHICLE-HOURS IN PM PEAK 3 HOURS, DAILY)



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This slide is based on adding a 27<sup>th</sup> project – increasing the capacity of I-5 through the City of Seattle by the equivalent of two additional lanes in each direction. Shown here are the resulting top 15 performers in reducing regional delay and indicates the approximate contribution by County. These 15 projects produce about 90% of the benefit resulting from all the projects.

**The five projects on I-5 (all in the top 15) would result in over half of all the delay reduction for the Top 15 projects and nearly half (47%) of the delay reduction resulting from all 27 projects. These projects are marked above with a red \*.**

# RANKING OF EGN 26 PROJECTS BY REGIONAL DELAY REDUCTION

NAME	ΔVHT	RANK			
			I-5 (SR2-Marysville)	(1,314.00)	13
I-5 (SR512-SR509)	(12,817.00)	1	SR522 (Wdnvl-Monroe)	(1,122.00)	14
SR167(SR512-I405)	(9,838.00)	2	I-5 (I405-SR2)	(1,111.00)	15
I-405(I5s-I5n)	(7,986.00)	3	SR525 (I405-SR526)	(1,022.00)	16
SR18 (SR169-I90)	(5,725.00)	4	Spokane viaduct	(987.00)	17
SR512 (SR167-Meridian Exit)	(3,775.00)	5	I-90 (Eastgate-Sunset	(949.00)	18
SR167 (SR509-SR512)	(2,539.00)	6	Intrch)	(948.00)	19
I-605 (I90-SR9)	(2,230.00)	7	I-5 (N.Gate-I405)	(837.00)	20
SR509(Trm-I5)	(2,218.00)	8	SR518 (I5- SeaTac Exit)	(837.00)	20
SR161 (Meridian Ave SR512-178th)	(2,117.00)	9	US-2 ( SR9- Sultan)	(521.00)	21
SR520 (I5-I405)	(1,707.00)	10	SR92 (SR9-Granite Fls23)	(353.00)	22
SR9 (SR522-SNO_CO line)	(1,608.00)	11	NOVATEC (AVIATION		
SR509(Trm-1st B HOV)	(1,562.00)	12	SR203) *	365.00	23
			SR520 (I405-SR202) *	544.00	24
			SR202 (Wdnvl-Sahalee) *	655.00	25
			SR908 (Redmond-I5) *	807.00	26

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This shows the 26 projects ranked by regional delay reduction in the PM Peak 3 hours. Unlike the previous slide, this does not include a capacity increase for I-5 through the City of Seattle. Note that the last 4 projects show an increase in delay. The next two slides discuss this situation in more detail.

### Lane-Miles by County – 26 EGN Projects

EGN PROJECT		APPROX. LANE-MILES BY COUNTY		
#	NAME	Snohomish	Pierce	King
1	I-5 (SR512-SR509)	-	99	25
2	SR167 (SR509-SR512)	-	28	-
3	SR167(SR512-I405)	-	13	54
4	SR509(Trm-I5)	-	-	10
5	I-405(I5s-I5n)	26	-	128
6	SR509(Trm-1st B HOV)	-	-	18
7	I-5 (N.Gate-I405)	9	-	11
8	I-5 (I405-SR2)	54	-	-
9	I-5 (SR2-Marysville)	43	-	-
10	I-605 (I90-SR9)	34	-	80
11	SR512 (SR167-Meridian Exit)	-	6	-
12	SR518 (I5- SeaTac Exit)	-	-	6
13	SR18 (SR169-I90)	-	-	20
14	SR161 (Meridian Ave SR512-178th)	-	58	-
15	SR520 (I5-I405)	-	-	25
16	SR520 (I405-SR202)	-	-	34
17	SR202 (Wdnvl-Sahalee)	-	-	21
18	SR908 (Redmond-I5)	-	-	10
19	SR525 (I405-SR526)	11	-	-
20	SR522 (Wdnvle-Monroe)	21	-	4
21	SR9 (SR522-SNO_CO line)	86	-	-
22	SR92 (SR9-Granite Fls23)	15	-	-
23	Novelty Hill Rd (AvndI-SR203)	-	-	9
24	Spokane viaduct	-	-	2
25	I-90 (Estgt-Sunset Intrch)	-	-	16
26	US-2 ( SR9- Sultan)	118	-	-
		417	204	472
		38%	19%	43%

This shows the approximate distribution of lane-miles for the 26 projects by County.

# RANKING THE PROJECTS BY NEW TRIPS SERVED

- This second ranking compared:
  - The number of 2020 trips using each project with...
  - The number of 1998 trips that would have used the same project, had it existed in 1998

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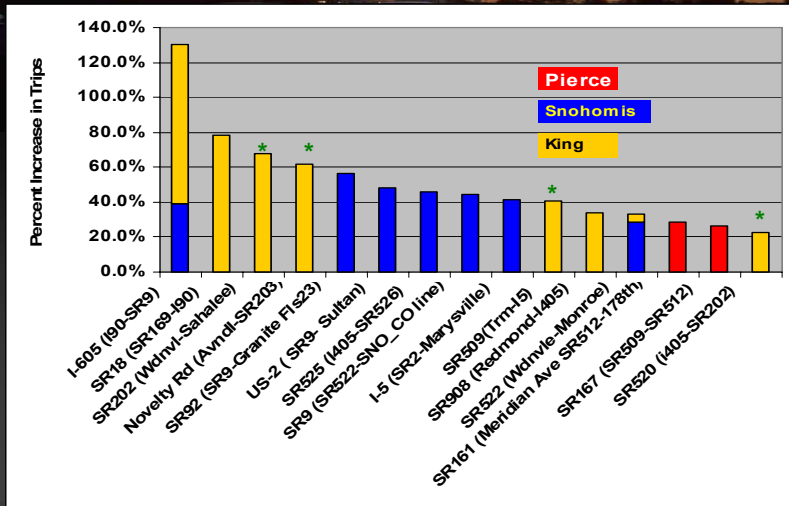
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The first ranking, by delay reduction, showed that there were 4 projects that caused an increase in delay. At first blush this would suggest these 4 were lousy projects. However, in comparing 2020 trip volumes with the volumes that would have used the project in 1998, we found that the average increase in trips on these projects was higher than for the other 22. These projects were attracting trips, but the total trip times (not just on the specific project, but including times for the entire trip from origin to destination) were higher than under 1998 volume conditions. In other words, delay was encountered getting to and/or from the new projects/

We have concluded that projects with increased delay are a warning that more improvements are required in the vicinity of the project. These improvements would be some combination of further refinements to the project itself, or improvements to other related roadway links that are causing delay and need improvement. In a later iteration of this process, we intend to incorporate these improvements.

# TOP 15 PROJECTS IN % TRIP INCREASE (PM PEAK 3 HOURS)



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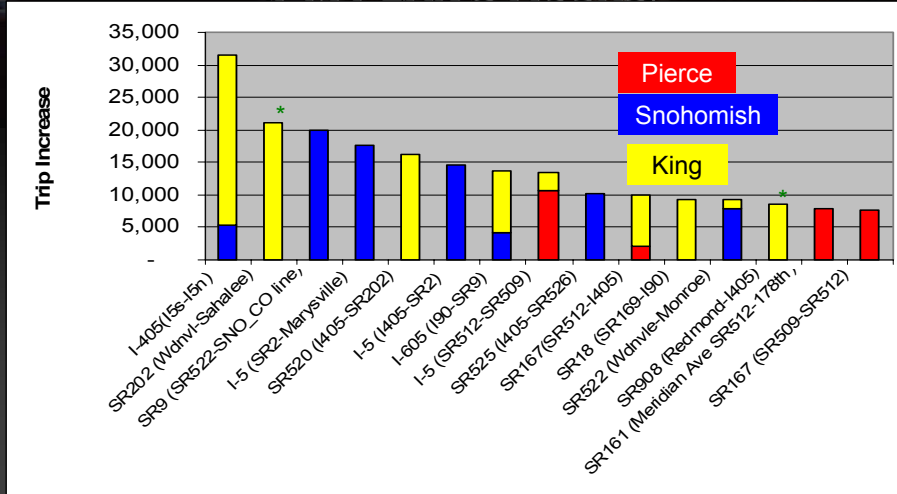
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Here are the top 15 projects ranked by the percentage increase in trips from 1998 trips to 2020 trips, as described on the previous slide. Eight of the projects are in the top 15 in both rankings. However, it is more important to note that all four of the projects that showed an increase in delay (marked with an asterisk \* on the slide) are in the top 15 for trip increases. Also note that they are all in the Redmond area, indicating that the roadway network in that area needs further improvement.

# TOP 15 PROJECTS IN TRIP INCREASE (PM PEAK 3 HOURS)

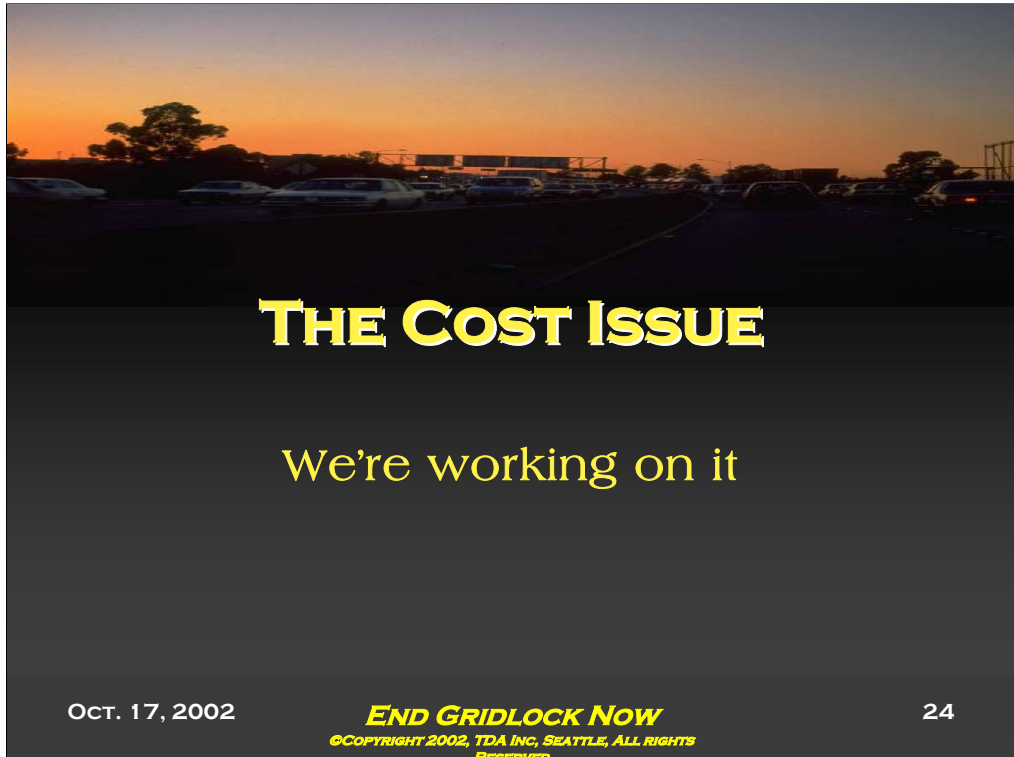


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This is similar to the previous slide but ranks the projects by the number of new trips served. Eleven of the 15 were also in the Top 15 in percent increase of trips.



One of our objectives is to rank projects, not just by the amount of delay reduction, but also by the amount of delay reduction per dollar of investment. However, estimation of costs is a complex issue. The complexity is illustrated by the wide range of WSDOT estimates of cost per lane-mile for projects in the Puget Sound region. We are continuing to develop cost estimates for the EGN projects.



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This is the last slide of the presentation. The four following pages provide more detailed descriptions of the 26 projects.